US011583467B2

(12) **United States Patent**
Kodama

(10) **Patent No.: US 11,583,467 B2**
(45) **Date of Patent: Feb. 21, 2023**

(54) **CHAIR-TYPE MASSAGE MACHINE**

(71) Applicant: **Fuji Medical Instruments Mfg. Co., Ltd.**, Osaka (JP)

(72) Inventor: **Shogo Kodama**, Osaka (JP)

(73) Assignee: **Fuji Medical Instruments Mfg. Co., Ltd.**, Osaka (JP)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 479 days.

(21) Appl. No.: **16/801,317**

(22) Filed: **Feb. 26, 2020**

(65) **Prior Publication Data**

US 2020/0405569 A1 Dec. 31, 2020

(30) **Foreign Application Priority Data**

Jun. 28, 2019 (JP) JP2019-121108

(51) **Int. Cl.**

A47C 7/62	(2006.01)
A61H 7/00	(2006.01)
A47C 1/022	(2006.01)
A47C 31/00	(2006.01)
G06F 3/0482	(2013.01)

(52) **U.S. Cl.**

CPC ***A61H 7/00*** (2013.01); ***A47C 1/022*** (2013.01); ***A47C 31/008*** (2013.01); ***G06F 3/0482*** (2013.01); *A61H 2201/0149* (2013.01); *A61H 2201/0161* (2013.01); *A61H 2201/5028* (2013.01)

(58) **Field of Classification Search**

CPC A47C 31/008; A61H 2201/0149; G06F 3/0482

USPC 297/188.16, 145, 217.3–217.5

See application file for complete search history.

(56) **References Cited**

U.S. PATENT DOCUMENTS

4,576,149	A *	3/1986	Otuka	A61H 15/00 601/99
4,759,584	A *	7/1988	Dykstra	B60N 3/102 297/188.16
5,076,524	A *	12/1991	Reh	B60N 2/79 297/217.3 X
5,195,709	A *	3/1993	Yasushi	B64D 11/0646 297/217.3 X
5,374,104	A *	12/1994	Moore	B64D 11/00153 297/188.16 X
6,007,036	A *	12/1999	Rosen	B64D 11/0627 297/217.3
6,039,702	A *	3/2000	Cutler	A61H 23/0263 601/57
6,117,094	A *	9/2000	Fujii	A61H 39/04 601/102

(Continued)

FOREIGN PATENT DOCUMENTS

JP 2017-140275 A 8/2017

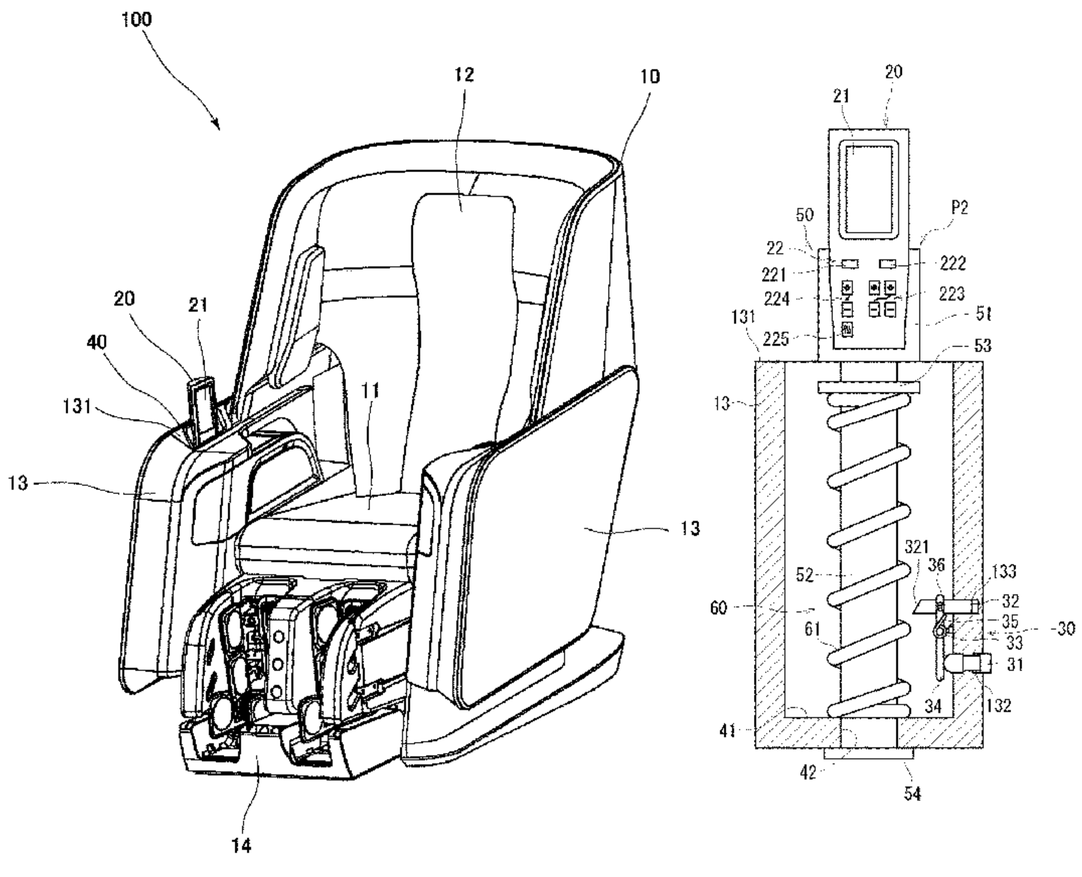
Primary Examiner — Rodney B White

(74) *Attorney, Agent, or Firm* — Masuvalley & Partners; Peter R. Martinez

(57) **ABSTRACT**

A chair-type massage machine includes a main body on which a person to be treated is to be seated, a holding part at least part of which is placed inside a container recess to hold a first operation unit, and a moving mechanism for moving the holding part. The holding part is reciprocatably moved between a first position in which the first operation unit is contained in the container recess and a second position in which the first operation unit is exposed. The chair-type massage machine further includes a second operation unit for moving the holding part.

5 Claims, 10 Drawing Sheets



(56) **References Cited**

U.S. PATENT DOCUMENTS

6,171,266	B1 *	1/2001	Inada	A61H 23/00 601/102
6,517,500	B2 *	2/2003	Ichikawa	A61H 9/0078 601/97
6,592,533	B1 *	7/2003	Yonekawa	A47C 4/54 601/49
7,189,211	B2 *	3/2007	Inada	A61H 23/0254 601/99
7,195,604	B2 *	3/2007	Nakamura	A61H 23/04 601/149
7,241,271	B2 *	7/2007	Kurata	A61H 1/0266 601/34
7,261,266	B2 *	8/2007	Satterfield	B64D 11/00153 297/217.3
7,293,839	B2 *	11/2007	Shimizu	A61H 7/004 297/423.35
8,083,700	B2 *	12/2011	Tanizawa	A61H 23/04 601/151
8,827,938	B2 *	9/2014	Fukuyama	A47C 3/02 601/102
9,377,870	B2 *	6/2016	Kim	G06F 3/0236
9,715,822	B2 *	7/2017	Hille	A47C 20/041
9,813,239	B2 *	11/2017	Chee	G16H 20/30
10,663,730	B2 *	5/2020	Jung	G16H 30/20
10,966,901	B2 *	4/2021	Masuda	G06F 1/163
11,103,673	B2 *	8/2021	Bae	A61H 15/00
11,278,466	B2 *	3/2022	Yoshida	A61H 7/007
2007/0273180	A1 *	11/2007	Tanizawa	A61H 1/0274 297/85 M
2007/0273187	A1 *	11/2007	Tanizawa	A61H 15/0078 297/217.3
2008/0030053	A1 *	2/2008	Kamba	A61H 1/003 297/217.3 X
2008/0185888	A1 *	8/2008	Beall	A47C 7/723 297/217.3 X
2010/0320819	A1 *	12/2010	Cohen	A61H 23/0236 297/217.3 X
2011/0077563	A1 *	3/2011	Fukuyama	A47C 3/02 601/98
2013/0088059	A1 *	4/2013	Nagamitsu	A61H 1/003 297/260.1
2016/0113835	A1 *	4/2016	Tan	A61H 23/006 601/116
2016/0374885	A1 *	12/2016	Tan	A61H 1/008 601/134
2019/0183722	A1 *	6/2019	Le	A47C 1/00
2019/0290533	A1 *	9/2019	Le	A47C 1/00
2020/0197255	A1 *	6/2020	Bae	A47C 31/126
2020/0281359	A1 *	9/2020	Fukunaga	A47C 31/008
2020/0397644	A1 *	12/2020	Jung	A61H 1/00
2022/0183922	A1 *	6/2022	Le	A61H 39/08

* cited by examiner

Fig.1

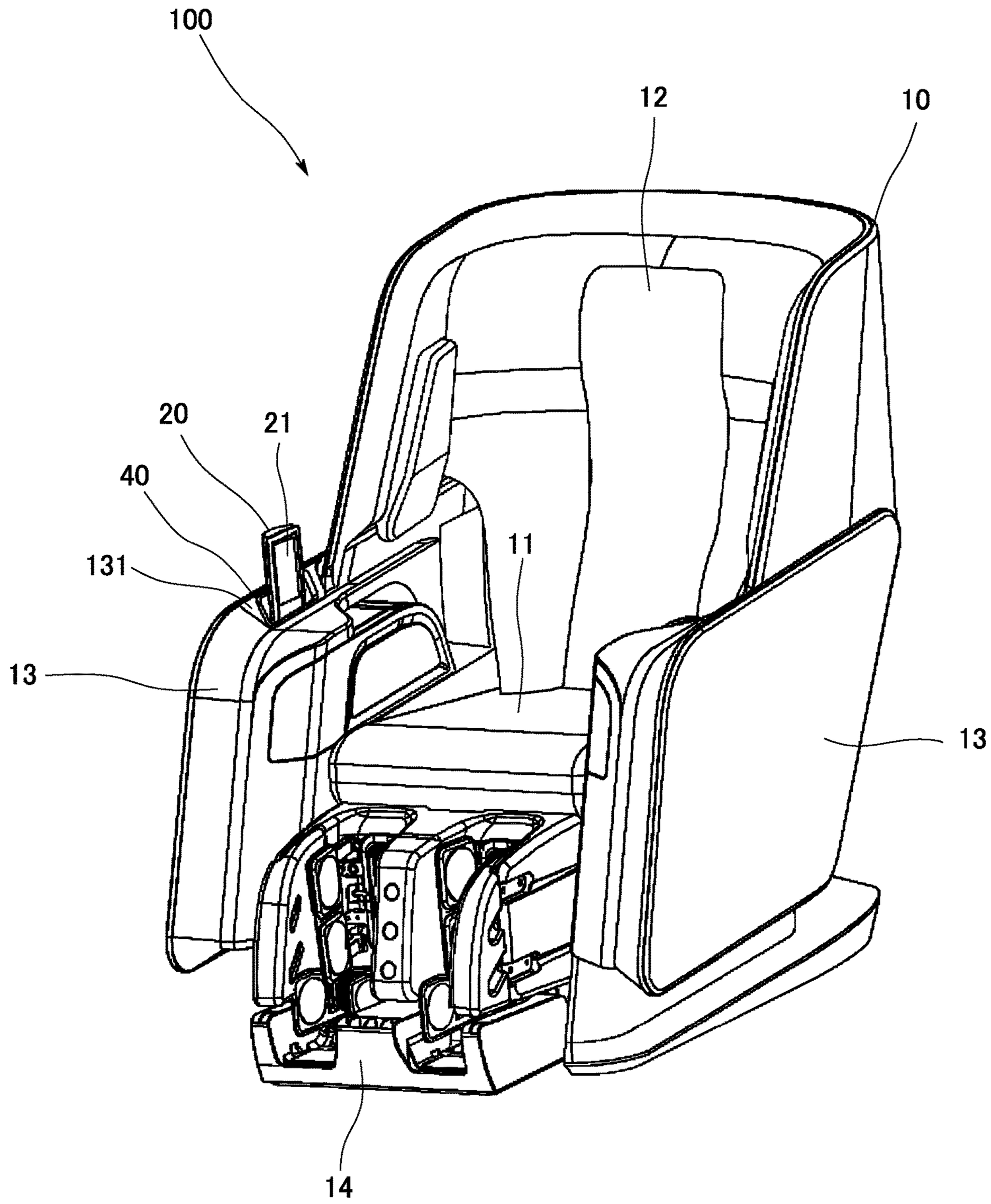


Fig. 2

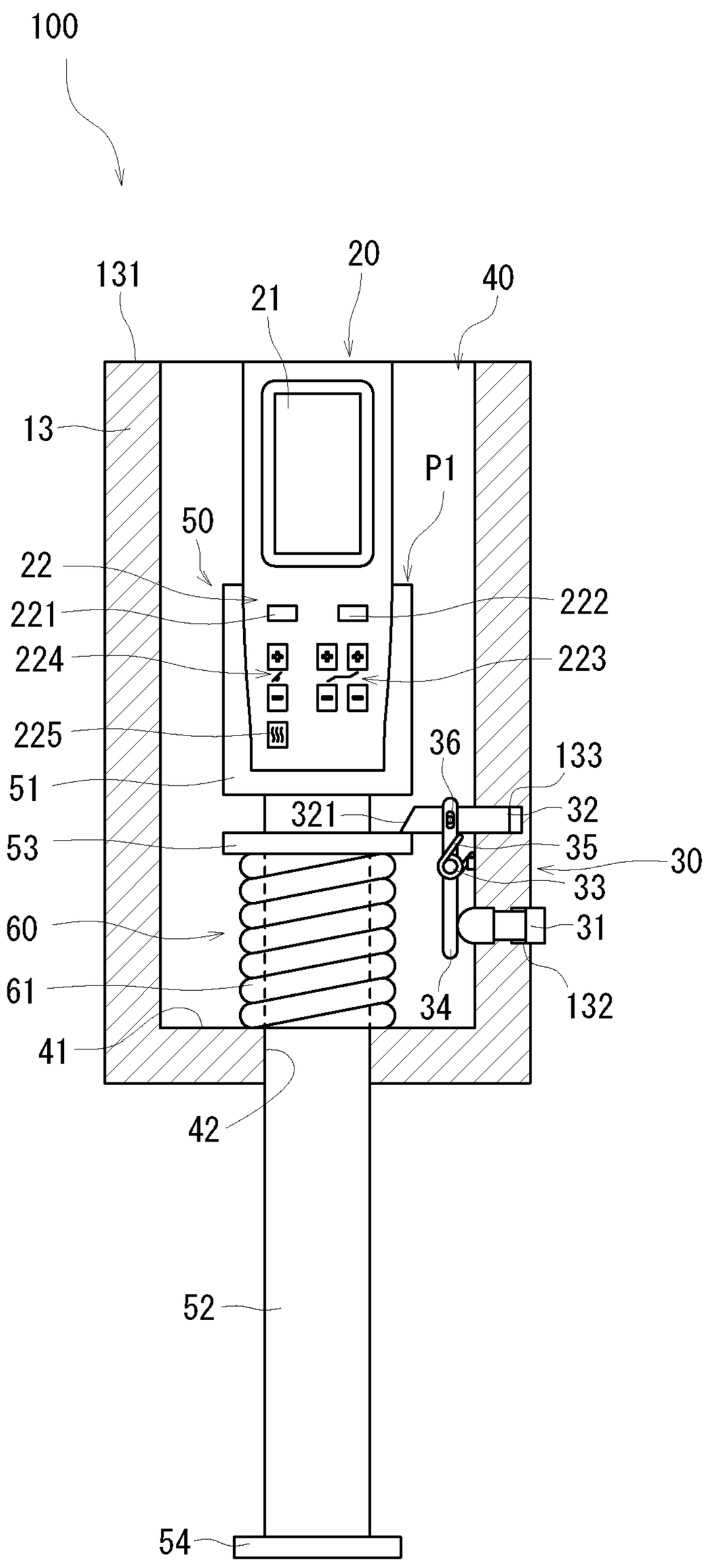

100
131
21
20
40
13
P1
50
22
221
222
224
223
225
36
133
51
321
32
53
35
30
33
60
31
61
34
132
41
42
52
54

Fig. 3

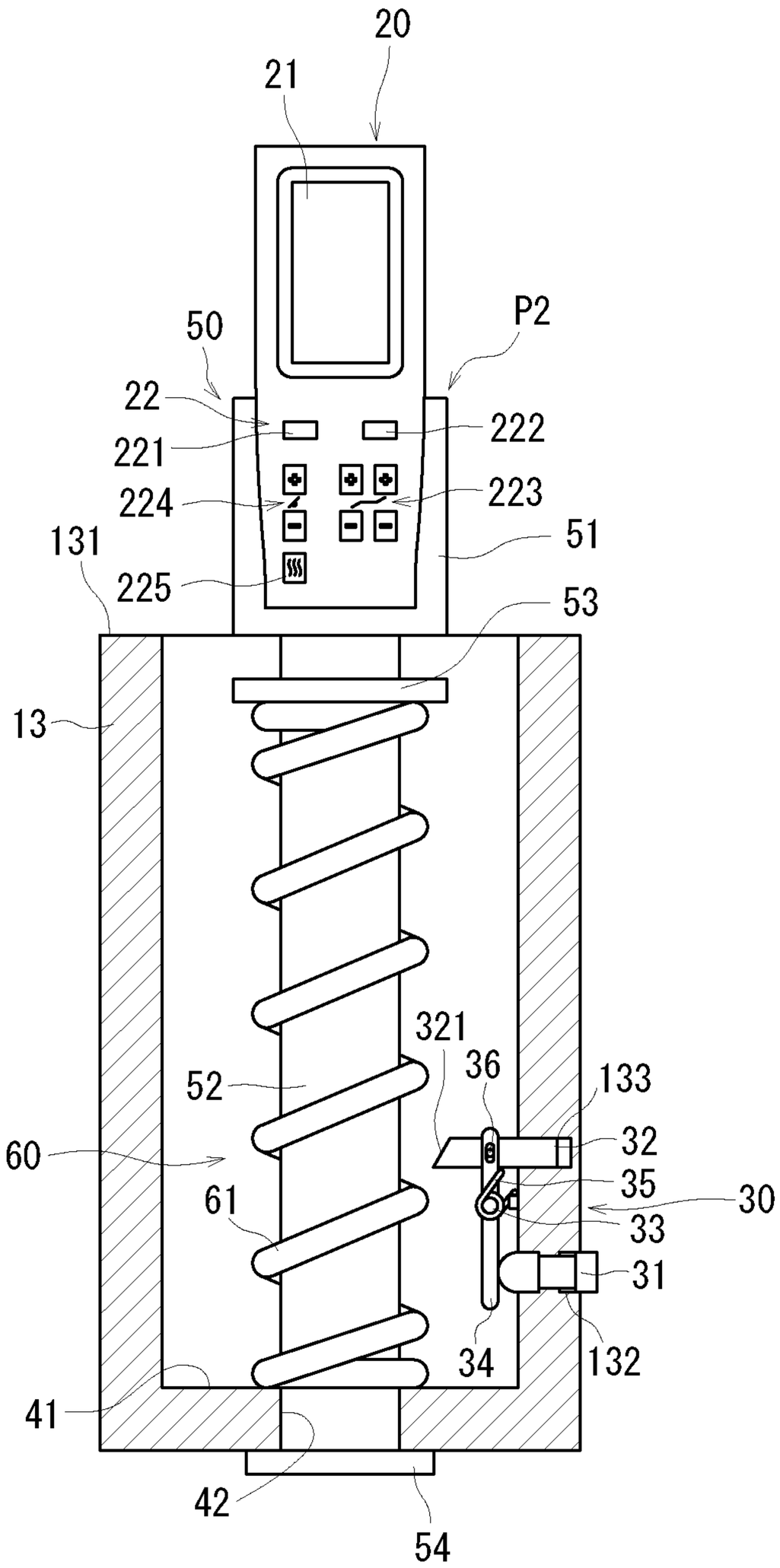

20
21
50
P2
22
222
221
223
224
51
131
225
53
13
321
36
133
52
32
60
35
30
61
33
31
34
132
41
42
54

Fig. 4

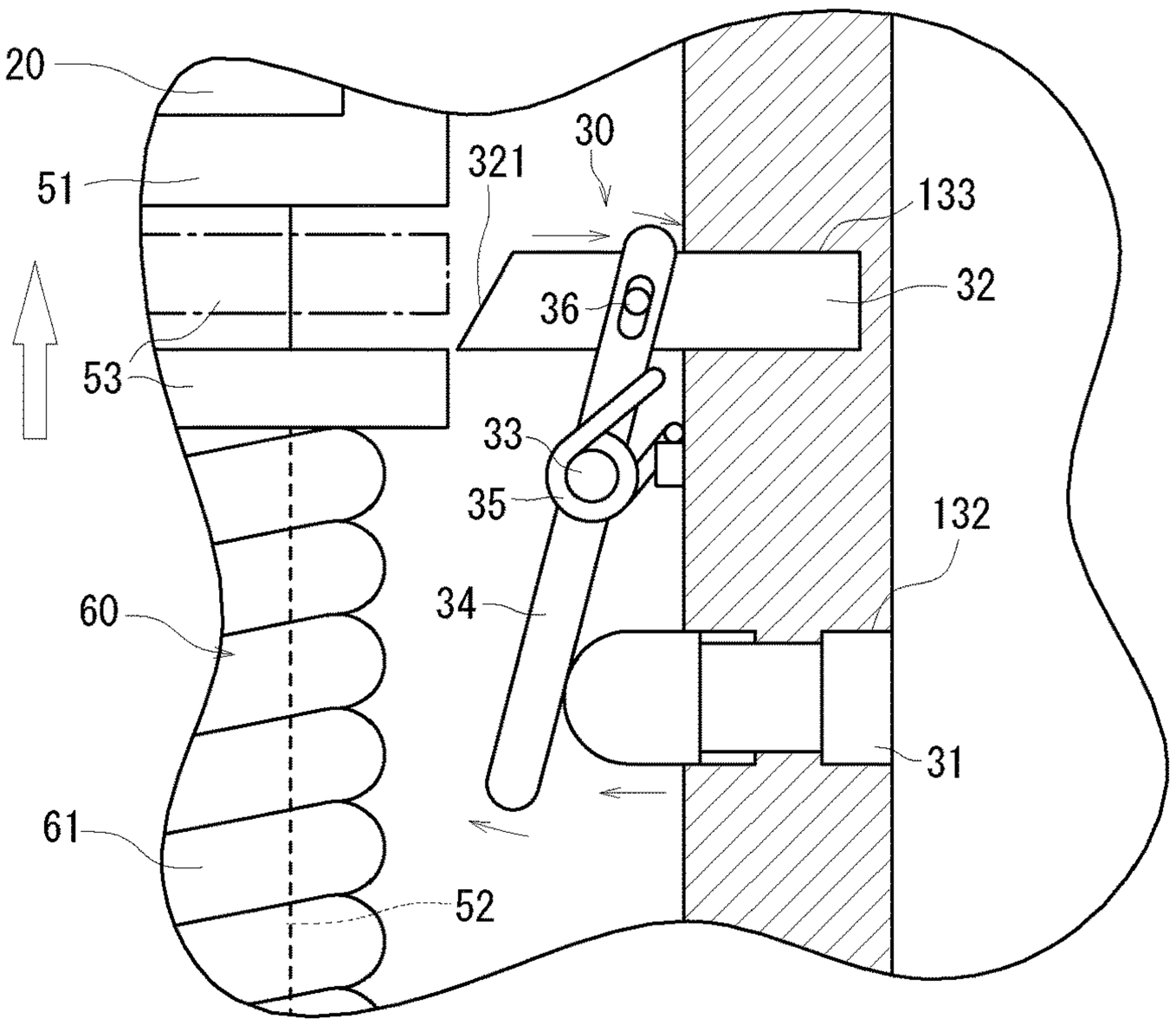

20
51
321
30
133
32
36
53
33
35
132
34
60
31
61
52

Fig. 5

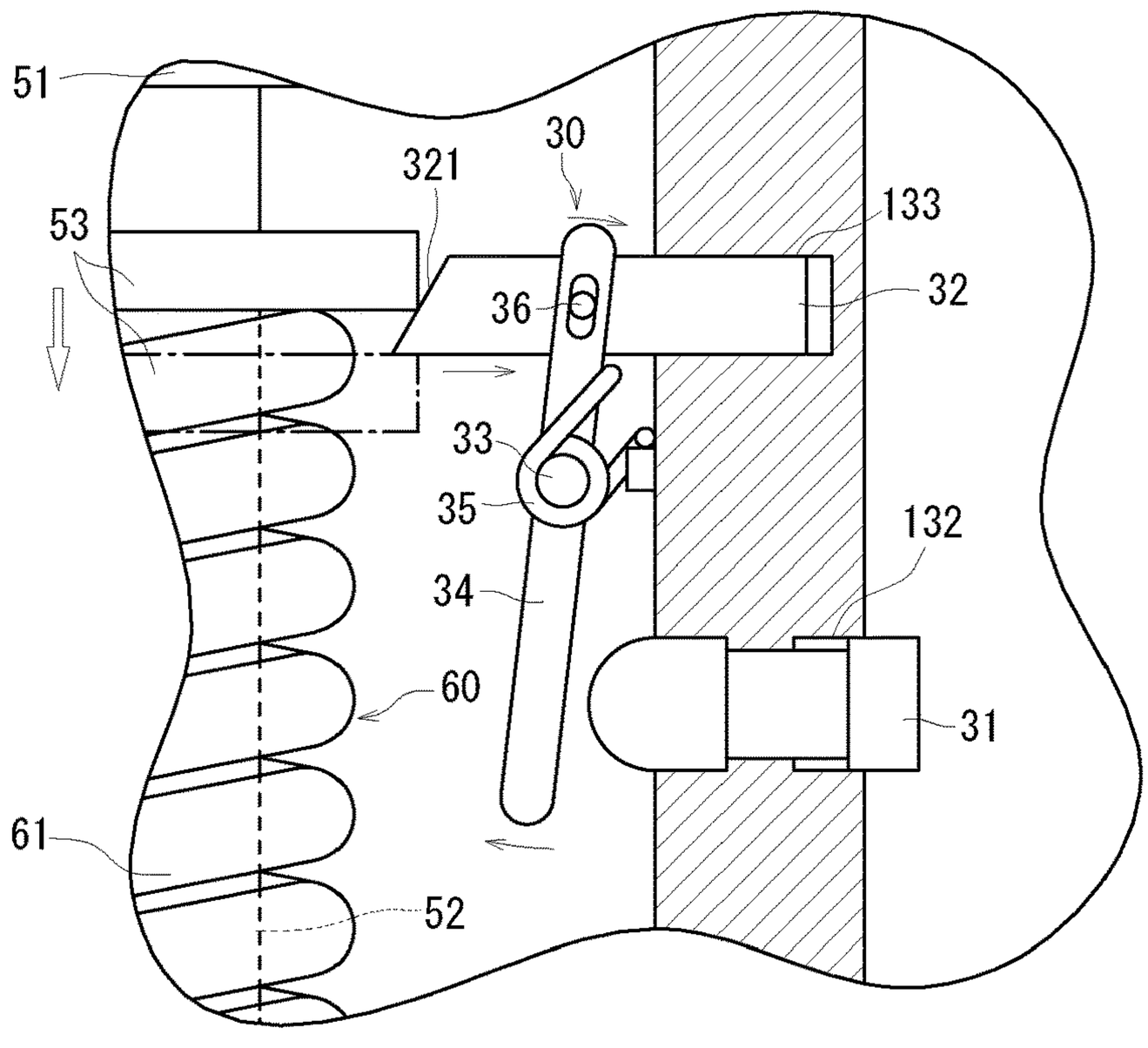

51
30
321
133
53
32
36
33
35
132
34
60
31
61
52

Fig. 6

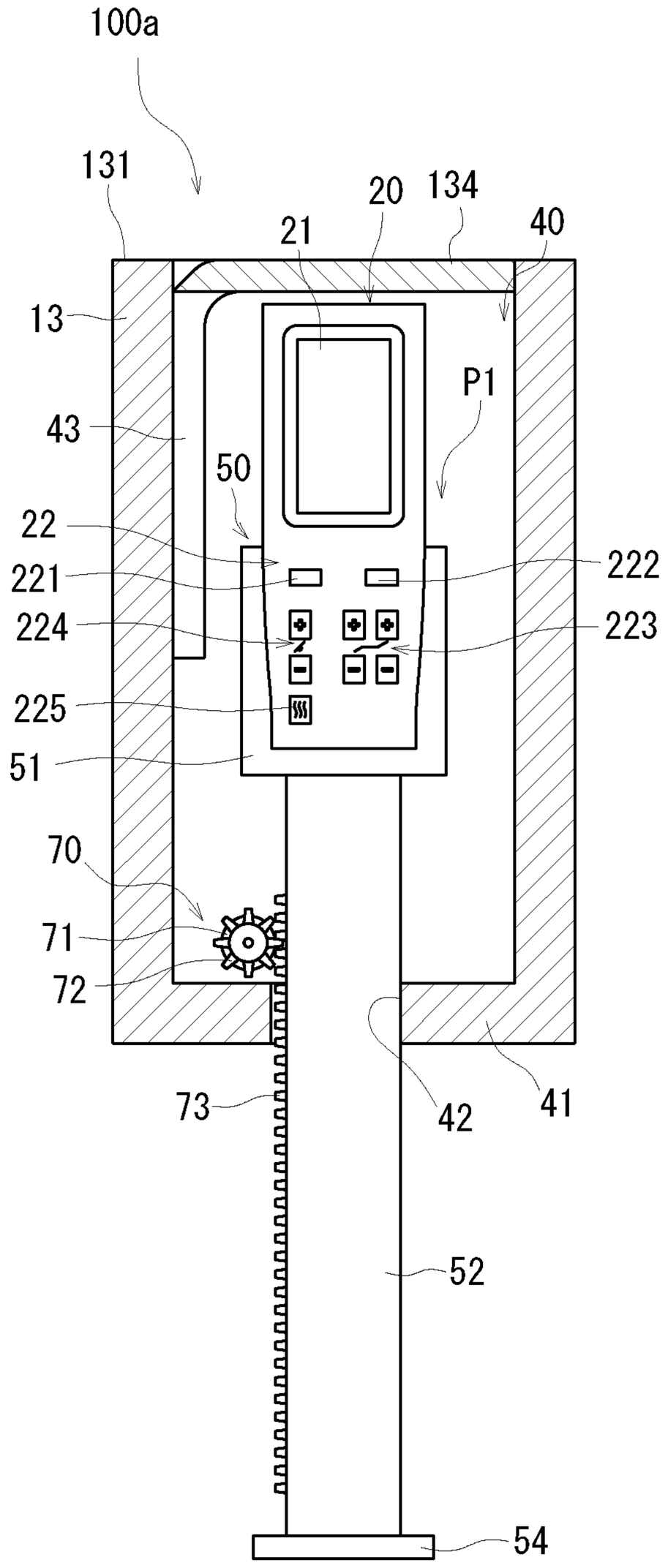

100a
131
20
134
40
21
13
P1
43
50
22
222
221
224
223
225
51
70
71
72
73
42
41
52
54

Fig. 7

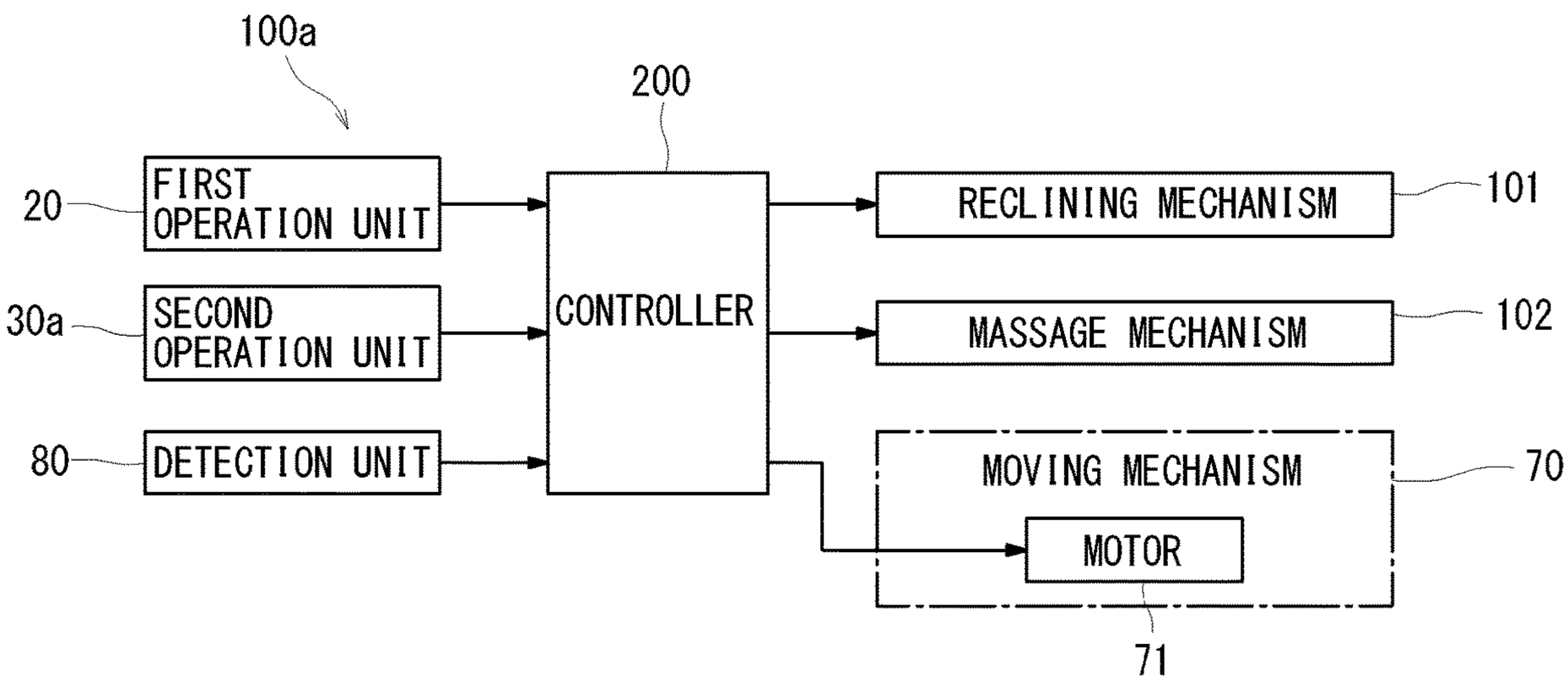

100a
200
20
FIRST OPERATION UNIT
30a
SECOND OPERATION UNIT
80
DETECTION UNIT
CONTROLLER
RECLINING MECHANISM
101
MASSAGE MECHANISM
102
MOVING MECHANISM
70
MOTOR
71

Fig. 8

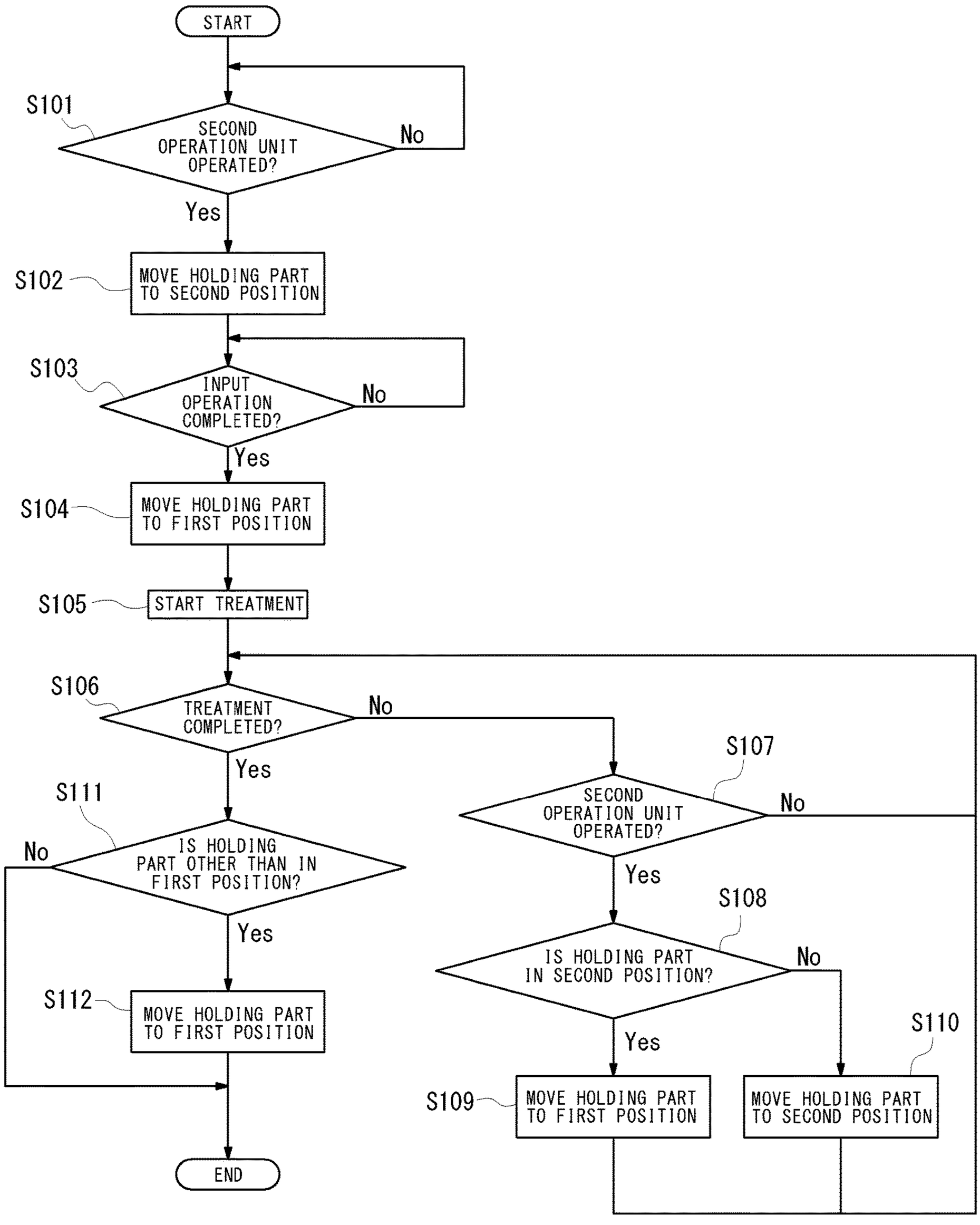

START
S101
SECOND OPERATION UNIT OPERATED?
No
Yes
S102
MOVE HOLDING PART TO SECOND POSITION
S103
INPUT OPERATION COMPLETED?
No
Yes
S104
MOVE HOLDING PART TO FIRST POSITION
S105
START TREATMENT
S106
TREATMENT COMPLETED?
No
Yes
S107
SECOND OPERATION UNIT OPERATED?
No
Yes
S108
IS HOLDING PART IN SECOND POSITION?
No
Yes
S109
MOVE HOLDING PART TO FIRST POSITION
S110
MOVE HOLDING PART TO SECOND POSITION
S111
IS HOLDING PART OTHER THAN IN FIRST POSITION?
No
Yes
S112
MOVE HOLDING PART TO FIRST POSITION
END

Fig. 9

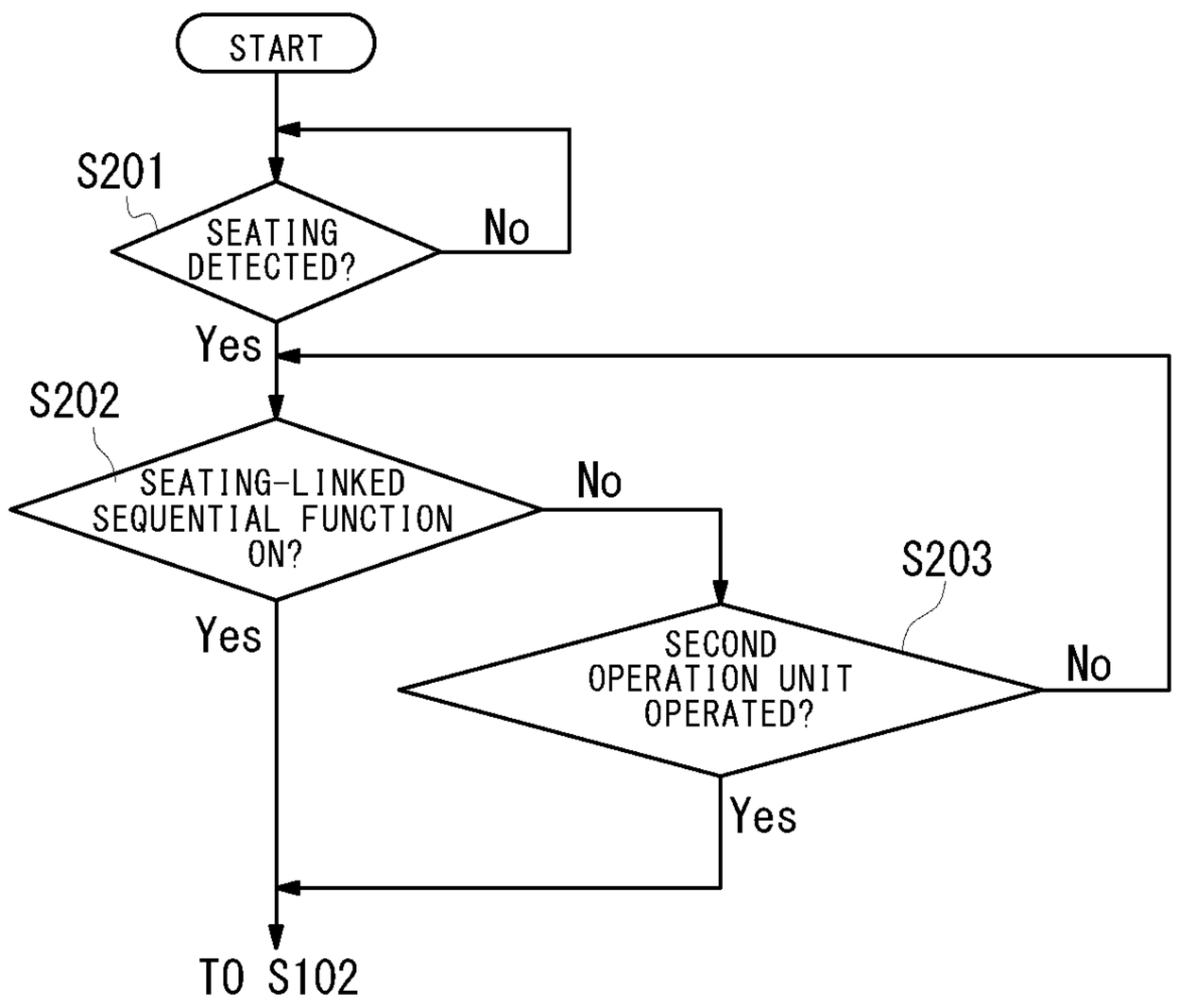

START
S201
SEATING DETECTED?
No
Yes
S202
SEATING-LINKED SEQUENTIAL FUNCTION ON?
No
Yes
S203
SECOND OPERATION UNIT OPERATED?
No
Yes
TO S102

Fig. 10

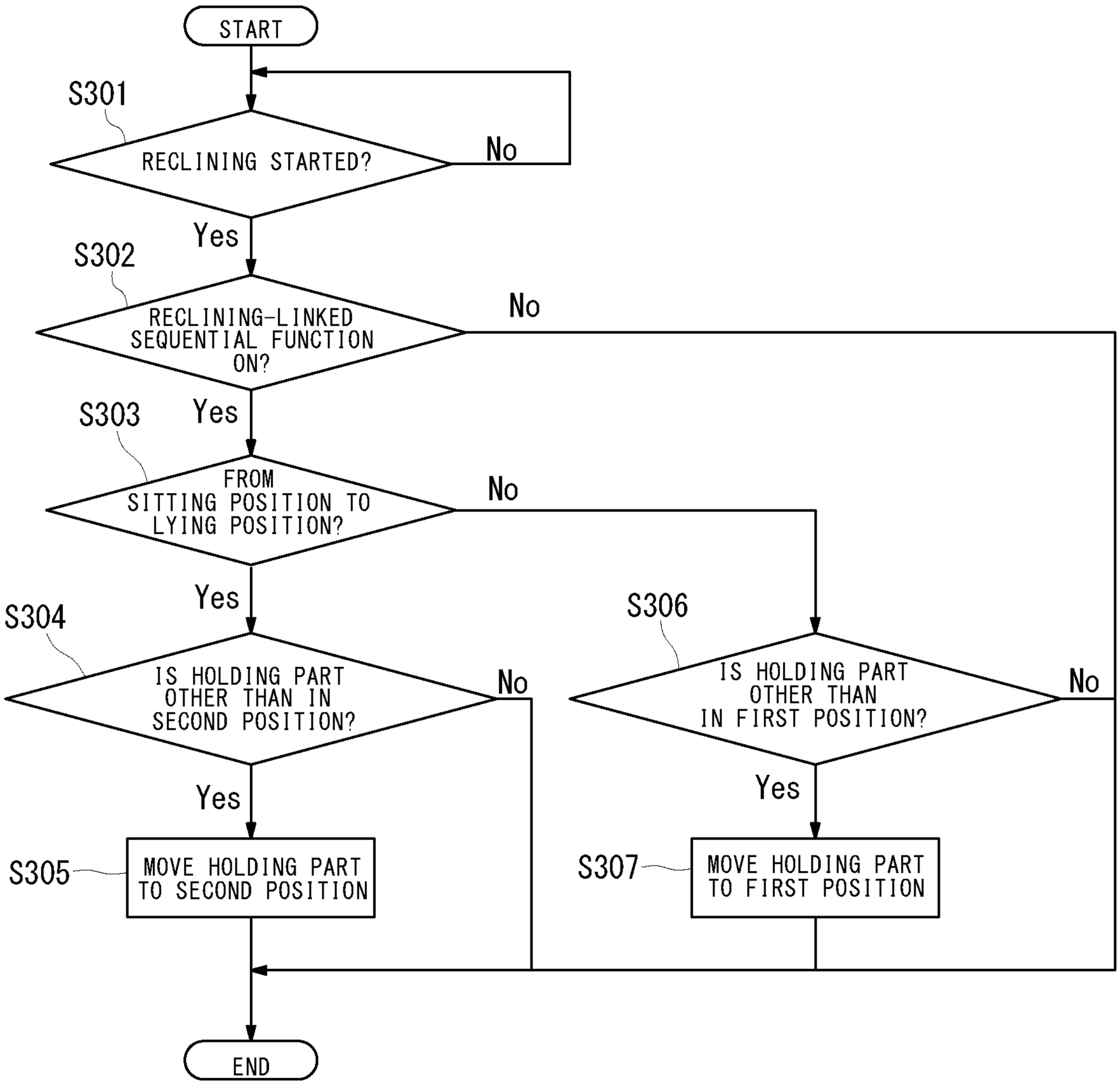
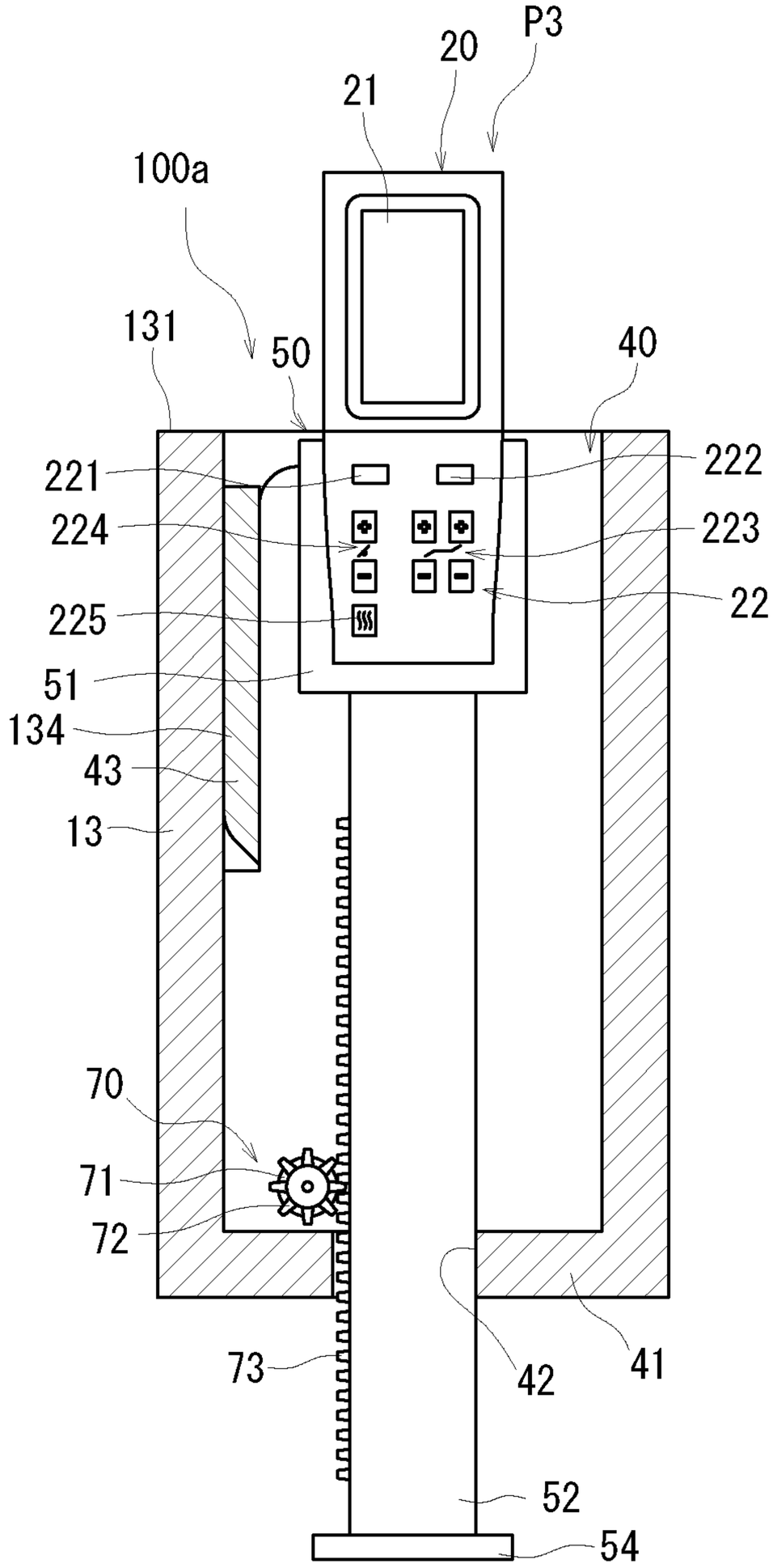

START
S301
RECLINING STARTED?
No
Yes
S302
RECLINING-LINKED SEQUENTIAL FUNCTION ON?
No
Yes
S303
FROM SITTING POSITION TO LYING POSITION?
No
Yes
S304
IS HOLDING PART OTHER THAN IN SECOND POSITION?
No
Yes
S305
MOVE HOLDING PART TO SECOND POSITION
S306
IS HOLDING PART OTHER THAN IN FIRST POSITION?
No
Yes
S307
MOVE HOLDING PART TO FIRST POSITION
END

Fig. 11


P3
20
21
100a
131
50
40
221
222
224
223
225
22
51
134
43
13
70
71
72
73
42
41
52
54

CHAIR-TYPE MASSAGE MACHINE

RELATED APPLICATIONS

This application is based upon and claims the benefit of priority from the corresponding Japanese Patent Application No. 2019-121108 (filed on Jun. 28, 2019), the contents of which are incorporated herein by reference.

BACKGROUND OF THE INVENTION

Field of the Invention

The present invention relates to a chair-type massage machine capable of containing an operation unit.

Description of Related Art

JP 2017-140275 A discloses a chair-type massage machine which includes a pocket part capable of containing a remote control unit.

The chair-type massage machine described in JP 2017-140275 A, having a structure capable of containing a remote control unit, requires a person to be treated to grasp and draw out the remote control unit from the pocket part on occasions of use of the remote control unit. Thus, taking out the remote control unit is burdensome for the user.

SUMMARY OF THE INVENTION

Accordingly, an object of the present invention is to provide a chair-type massage machine including an operation unit which, while out of use, is less obstructive for a person to be treated and which can be easily taken out on occasions of its use.

In order to achieve the above object, the present invention provides a chair-type massage machine including: a main body on which a person to be treated is to be seated; a first operation unit for accepting an input operation made by the person to be treated; a container recess formed in the main body and capable of containing the first operation unit; a holding part at least part of which is placed inside the container recess to hold the first operation unit; and a moving mechanism for moving the holding part. The holding part is reciprocatably movable between a first position in which at least part of the first operation unit is contained inside the container recess and a second position in which the first operation unit is exposed out of the container recess at a ratio larger than that of the first position. The chair-type massage machine further includes a second operation unit which is placed on the main body and which, based on an operation by the person to be treated, instructs the moving mechanism to execute movement of the holding part.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** is a perspective view of a chair-type massage machine according to the present invention;

FIG. **2** is a schematic sectional view showing a state in which a first operation unit is contained in a container recess;

FIG. **3** is a schematic sectional view showing a state in which the first operation unit is exposed outside from the container recess;

FIG. **4** is a view showing an operation of a second operation unit when a push button is pushed;

FIG. **5** is a view showing an operation of the second operation unit in setting the first operation unit into a first position;

FIG. **6** is a schematic sectional view showing a state in which the first operation unit is contained in the container recess;

FIG. **7** is a schematic block diagram of a chair-type massage machine shown in FIG. **6**;

FIG. **8** is a flowchart showing operations of the chair-type massage machine;

FIG. **9** is a flowchart showing operations of a seating-linked sequential function;

FIG. **10** is a flowchart showing a reclining-linked sequential function; and

FIG. **11** is a view showing the first operation unit set in a third position.

DESCRIPTION OF EMBODIMENTS

Hereinbelow, embodiments of the present invention will be described with reference to the accompanying drawings. FIG. **1** is a perspective view of a chair-type massage machine **100** according to the present invention. FIG. **2** is a schematic sectional view showing a state in which a first operation unit **20** is contained in a container recess **40**. FIG. **3** is a schematic sectional view showing a state in which the first operation unit **20** is exposed outside from the container recess **40**. Although the first operation unit **20** is oriented frontward in FIGS. **2** and **3**, yet this orientation is for an easier explanation and may be other than actual ones.

In the following description, positions and directions of the chair-type massage machine **100** and its configurational components may be indicated by 'left,' 'right,' up' and 'down.' These indications are on a basis of the chair-type massage machine **100** shown in FIG. **1**. Moreover, these directions are congruous with directions viewed from the person to be treated seated on the chair-type massage machine **100**.

<Chair-Type Massage Machine **100**>

The chair-type massage machine **100** is to massage and relax (hereinafter, this operation will be referred to as treatment) the whole body of a person to be treated held on the massage machine. As shown in FIGS. **1** to **3**, the chair-type massage machine **100** includes a main body **10**, a first operation unit **20**, a second operation unit **30**, a container recess **40**, a holding part **50**, and a moving mechanism **60**. In addition, an unshown cover is attached to the chair-type massage machine **100**.

<Main Body **10**>

The person to be treated is seated on the main body **10**. The main body **10** includes a seat part **11**, a backrest part **12**, armrest parts **13**, and a leg and foot treatment part **14**. The seat part **11** holds buttocks and thighs of the person to be treated. The seat part **11** may include expansion/contraction portions for treating the buttocks or thighs. Each expansion/contraction portion includes, for example, a bag member (so-called air bag) which is enabled to repeat expansion and contraction by charging and discharging air. Hereinbelow, expansion/contraction portions to be used have a similar structure.

The backrest part **12** is placed in a rear of the seat part **11** and erectly provided upward of the seat part **11**. As will be detailed later, the backrest part **12** includes a so-called reclining mechanism **101** having a function of tilting its upper portion rearward relative to the seat part **11**. In addition, the reclining mechanism **101** includes a motor (not shown) for driving the backrest part **12**.

The backrest part **12** includes a back treatment portion (not shown) for, while moving in the longitudinal direction, massaging the back of the person to be treated. The backrest part **12** may also include expansion/contraction portions for massaging shoulders and side part of upper-arm of the person to be treated held by the backrest part **12**.

The armrest parts **13** allow arms of the person to be treated seated on the seat part **11** to be rested thereon. The armrest parts **13** are placed so as to be paired on the left and right of the seat part **11**. The armrest parts **13** may include arm treatment portions for massaging the arms, i.e. forearms, wrists and fingers, of the person to be treated. Also, a container recess **40** in which the first operation unit **20** is contained is formed in an upper face **131** of one armrest part **13**. Details of the container recess **40** will be described later.

The leg and foot treatment part **14** is placed in front of the seat part **11** and vertically provided downward of the seat part **11**. The leg and foot treatment part **14** is so made up that lower end-side part of the leg and foot treatment part **14** is pivotable about an upper end of the leg and foot treatment part **14** serving as a fulcrum. The leg and foot treatment part **14** has an expansion/contraction portion for massaging both left-and-right calves and foot portions. Also, the leg and foot treatment part **14** may include a treatment portion (not shown) which turns in contact with soles to massage the soles. In addition, the leg and foot treatment part **14** may be such that lower end-side part is pivoted upward in linkage with the reclining mechanism of the backrest part **12**.

The chair-type massage machine **100** is enabled to fulfill massage-treatment of the whole body for the person to be treated by each of the treatment portions. Hereinafter, the each of the treatment portions may be referred to comprehensively as massage mechanism. The massage mechanism includes an unshown pump for pressure-feeding compressed air to expansion/contraction portions, an unshown actuator (e.g., motor) for operating the back treatment portion, and the like.

<First Operation Unit **20**>

The first operation unit **20** accepts an input operation by the person to be treated. In the chair-type massage machine **100**, the first operation unit **20** is a remote control unit. Details of the first operation unit **20** are explained below.

As shown in FIG. **2**, the first operation unit **20** includes a display section **21** and an input section **22**. The display section **21** is a so-called touch panel-type display including a display panel and a touch sensing panel. The display section **21** displays a menu of plural items. Then, touching a menu item allows an input operation associated with the menu item to be fulfilled. Otherwise, it is also possible to display images (still images, motion images) upon request from the person to be treated.

The input section **22** includes a plurality of hardware buttons, so-called physical keys, that can be depressed by the person to be treated. The physical keys of the input section **22** include a power key **221**, an emergency stop key **222**, a posture control key **223**, a back treatment portion positioning key **224**, a heater key **225**, and the like.

In the first operation unit **20**, for example, setting by the touch panel of the display section **21** is used primarily to make input of settings before treatment, and setting by the input section **22** is used primarily to make control of settings during treatment.

An unshown cable is connected to the first operation unit **20**. The first operation unit **20** is supplied with electric power via the cable. Also, the first operation unit **20** transmits signals via the cable to the reclining mechanism, the massage mechanism, and the like. Although the reclining mechanism and the massage mechanism are to be operated directly from the first operation unit **20** in this embodiment, yet this is not limited to. A control unit may be provided independent of the first operation unit **20**.

As described above, the first operation unit **20** is used by the person to be treated to make settings of treatment contents before treatment. On the other hand, there is a fear that the first operation unit **20** may be obstructive when the person to be treated is seated on the main body **10** or when the person to be treated leaves the main body **10**. For this reason, in the chair-type massage machine **100** according to this embodiment, the first operation unit **20** is to be contained in the container recess **40** while out of use by the person to be treated, i.e., while not needed by the person to be treated.

The container recess **40** is a recessed space which is recessed downward from the upper face **131** of an armrest part **13**. The container recess **40** allows the first operation unit **20** to be inserted inside thereof. Besides, the holding part **50** and part of the moving mechanism **60**, in addition to the first operation unit **20**, are to be inserted into the container recess **40**.

The holding part **50** holds the first operation unit **20**. The holding part **50** includes a holding frame portion **51** and a guide pole portion **52**. The holding frame portion **51** grasps and holds the first operation unit **20**. In addition, the first operation unit **20** may be provided separable from the holding frame portion **51** or formed integrally with the holding frame portion **51**.

At least part of the holding part **50** is placed inside the container recess **40**. The holding part **50** is reciprocatable between a first position P**1** (see FIG. **2**) in which the first operation unit **20** is contained inside the container recess **40** and a second position (see FIG. **3**) in which the first operation unit **20** is exposed.

Although the first position P**1** is set to a position in which the first operation unit **20** is fully contained in the container recess **40** in this embodiment, yet this is not limited to. The first position P**1** may be such that the first operation unit **20** is protruded from the container recess **40** to such an extent as to be less obstructive when the person to be treated is seated on the seat part **11** or when the person to be treated leaves the seat part **11**. Further, although the second position P**2** is set to a position in which the first operation unit **20** is fully exposed, yet this is not limited to. The second position P**2** needs only to be a position that allows the person to be treated to make input operation, and the first operation unit **20** may be contained only partly inside the container recess **40**. That is, the first position P**1** is a position in which at least part of the first operation unit **20** is contained inside the container recess **40**, and the second position P**2** is a position in which the first operation unit **20** is exposed out of the container recess **40** at a ratio larger than that of the first position P**1**.

The holding frame portion **51** is moved linearly up and down inside the container recess **40**. The guide pole portion **52** is a pole-shaped member extending downward from a lower face of the holding frame portion **51**. The guide pole portion **52** is inserted into a guide hole **42** formed in a bottom plate portion **41** of the container recess **40**. The guide pole portion **52** is movable up and down along the guide hole **42**. An anti-leaving portion **54** larger than the guide hole **42** is provided at a lower end of the guide pole portion **52**. When the holding part **50** is moved upward, the anti-leaving portion **54** is brought into contact with a marginal edge portion of the guide hole **42**, by which the guide pole portion **52** is restricted in movement.

Further, a spring receiver **53** is provided at a site where the guide pole portion **52** connects with the holding frame portion **51**, i.e., at a site lower than an upper end of the guide pole portion **52**. The spring receiver **53**, with which an end of a spring **61** of the moving mechanism **60** is put into contact, is subject to elastic force of the spring **61**.

The moving mechanism **60** performs movement of the holding part **50**. The moving mechanism **60** is placed inside the container recess **40**. The moving mechanism **60** includes the spring **61** as an elastic member. The moving mechanism **60** is not limited to the spring **61** and may be, for example, an air spring or others selected from a wide range of members that can bias the holding part **50** upward. The spring **61** is placed so as to surround the guide pole portion **52**. The spring **61** is so placed that its one end is in contact with a bottom plate portion **41** of the container recess **40** while the other end is in contact with the spring receiver **53**.

While the holding part **50** is in the first position P**1**, the spring **61** is compressed so as to be shorter than its equilibrium length. Therefore, while the holding part **50** is in the first position P**1**, the spring **61** biases the holding part **50** upward with the elastic force. Also while the holding part **50** is in the second position P**2**, the spring **61** is compressed so as to be shorter than its equilibrium length. As a result, also while being in the second position P**2**, the holding part **50** is pushed upward with biasing force of the spring **61**. By this biasing force, the holding part **50** is stopped at the second position P**2**. In addition, at least one of the holding part **50**, the moving mechanism **60** or the container recess **40** may include a mechanism for restricting downward movement of the holding part **50** being in the second position P**2**.

The moving mechanism **60** may include deceleration part (not shown) for restricting moving speed of the holding part **50**. The deceleration part may be implemented, for example, by using a member which is to be put into contact with the guide pole portion **52** to restrict the moving speed of the holding part **50** by friction, or fitting a damper or other like member which increases in resistance against the speed. Further, instead of providing the deceleration part, the moving speed of the holding part **50** may be adjusted by adjusting the spring constant and equilibrium length of the spring **61**.

The moving mechanism **60** is activated based on an operation of the second operation unit **30**. An explanation of the second operation unit **30** is given below. As shown in FIGS. **2** and **3**, the second operation unit **30** includes a push button **31**, a slider lock **32**, a pivotal shaft **33**, a link portion **34**, a torsion spring **35**, and a pin **36**.

The push button **31** is slidably provided in a button hole **132** which is a through hole formed in a side face on one side of an armrest part **13** closer to the seat part **11**. That is, the push button **31** is formed on the seat part **11** side of the armrest part **13**, but not limited to this. The push button **31** may be provided on one side of an armrest part **13** opposite to the seat part **11** side, as an example.

The push button **31** is formed into a columnar shape whose axial both ends are larger in diameter than its central portion. As a result, the push button **31** is prevented from leaving the button hole **132** both inward and outward of the container recess **40**. Also, the push button **31** is spherical-shaped on one side facing the inside of the container recess **40**. Accordingly, every time the push button **31** pushes the link portion **34**, it is always part of the sphere which makes contact with the link portion **34**, so that stress is less likely to concentrate to a contact spot. In addition, although the push button **31** is formed into a columnar shape in this embodiment, yet this is not limited to. For example, the push button **31** may be formed into a rectangular-parallelepiped shape, in which one end on one side facing the inside of the container recess **40** is formed into a curved surface curved toward a direction in which the link portion **34** extends.

The slider lock **32** is slidably inserted into a sliding recess **133** recessed outward from an inner circumferential surface of the container recess **40**. At an end portion of the slider lock **32**, a sloped surface **321** is formed so as to extend increasingly downward toward the end. The slider lock **32** has its lower face put into contact with the spring receiver **53** of the holding part **50**. That is, the slider lock **32** restricts upward movement of the holding part **50**.

The pivotal shaft **33** is a center axis serving as a pivotal center of the link portion **34**. The pivotal shaft **33** may be formed integrally with the link portion **34** or formed through the link portion **34** so as to pivotably hold the link portion **34**. The link portion **34** is pivotably held via the pivotal shaft **33** on the container recess **40**. The link portion **34** transfers a displacement (force) resulting from a push of the push button **31** to the slider lock **32**. Lower part of the link portion **34** is contactable with the push button **31**. Further, upper part of the link portion **34** is connected via the pin **36** to the slider lock **32**. In addition, in a case where the makeup of the link portion **34** is partly altered so that the slider lock **32** can be operated by handling of the push button **31**, the push button **31** may also be provided on the upper face of an armrest part **13**.

The pin **36** is attached to the slider lock **32** and extends in a direction perpendicular to both a moving direction of the holding part **50** and a sliding direction of the slider lock **32**. The link portion **34** has an elongated pin hole, and the pin **36** is movably set in the pin hole. Insertion of the pin **36** into the elongated pin hole makes it possible to absorb differences in distance from the center of the pivotal shaft **33** due to sliding of the slider lock **32**. As a result, as the link portion **34** is pivoted about the pivotal shaft **33**, the slider lock **32** can be slid along the sliding recess **133** via the pin **36**.

The torsion spring **35** is wound on the pivotal shaft **33**. By the torsion spring **35**, the link portion **34** is biased in such a direction that its upper part on the upper side of the pivotal shaft **33** approaches the holding part **50**. Then, the link portion **34** is stopped by making contact with an end of the push button **31**. As a result, the push button **31** can be maintained in a protruded state, and the slider lock **32** can be set to such a position as to restrict movement of the spring receiver **53**. The chair-type massage machine **100** has a configuration described hereinabove.

The second operation unit **30** described above is only an example and not limited to this case. For example, it is allowable that the push button **31** directly operates the slider lock **32** while the link portion is omitted, or that the push button **31** itself serves also as the slider lock. Moreover, the push button **31** is not limited in its location unless incapable of operating the moving mechanism **60**.

<Operations of First Operation Unit **20**>

Next, a protruding operation of the first operation unit **20** from the container recess **40** as well as its inserting operation into the container recess **40** in the chair-type massage machine **100** according to this embodiment will be described with reference to the drawings. FIG. **4** is a view showing an operation of the second operation unit **30** when the push button **31** is pushed. FIG. **5** is a view showing an operation of the second operation unit **30** when the holding part **50** is moved down so as to be contained in the first position P**1**.

While the holding part **50** is in the first position P**1**, an upper part of the link portion **34** on the upper side of the pivotal shaft **33** is pushed by the torsion spring **35** toward the

center of the container recess **40**. A resultant displacement (force) of the link portion **34** is transferred to the slider lock **32** via the pin **36**. The slider lock **32** is moved and biased toward the center of the container recess **40**. As a result, the lower face of the slider lock **32** is brought into contact with an upper face of the spring receiver **53** of the holding part **50**, so that upward movement of the holding part **50** is restricted. In addition, since a direction of force acting from the spring **61** onto the holding part **50** and a movable direction of the slider lock **32** differ from each other, the slider lock **32** is less likely to be pushed into the sliding recess **133** by the force of the spring **61**. Therefore, the slider lock **32** is enabled to restrict the movement of the holding part **50**.

As shown in FIG. **4**, when the part of the push button **31** protruded outside of the armrest part **13** is pushed by the person to be treated, the push button **31** is pushed inside of the container recess **40**. Then, lower part of the link portion **34** is pushed by the push button **31**, so that the link portion **34** is pivoted about the pivotal shaft **33**. By this pivoting of the link portion **34**, the slider lock **32** connected to the link portion **34** via the pin **36** is moved inside of the sliding recess **133**.

By the slider lock **32** being moved inside of the sliding recess **133**, the slider lock **32** is separated from the upper face of the spring receiver **53**. As a result, the movement restriction for the holding part **50** by the slider lock **32** is released, so that the holding part **50** is moved from the first position P**1** to the second position P**2** by elastic force of the spring **61** in the moving mechanism **60**.

The person to be treated is allowed to move the holding part **50** from the second position P**2** to the first position P**1** by depressing the first operation unit **20** held on the holding part **50** with a force larger than the elastic force of the spring **61**.

As shown in FIG. **5**, when the holding part **50** has got close to the first position P**1**, an edge portion of the spring receiver **53** is brought into contact with the sloped surface **321** of the slider lock **32**. As the holding part **50** is moved further downward, the sloped surface **321** is pushed by the edge portion of the spring receiver **53**, with the slider lock **32** moved into the sliding recess **133**. Then, when the holding part **50** has reached the first position P**1**, the spring receiver **53** is moved to under the slider lock **32**. The slider lock **32**, which has been pushed by the spring receiver **53** against the sliding recess **133**, is returned to the original position by the force of the torsion spring **35**, overlapping with upper part of the spring receiver **53**. As a result, upward movement of the holding part **50** is restricted.

As described above, in the chair-type massage machine **100** according to this embodiment, the first operation unit **20** can be contained inside the container recess **40**. By the first operation unit **20** being contained in the container recess **40**, the first operation unit **20** is not obstructive when the person to be treated is seated on the main body **10**. Also, as the person to be treated seated on the main body **10** operates the push button **31** of the second operation unit **30**, the holding part **50** is moved from the first position P**1** to the second position P**2**. As a result of this, the first operation unit **20** is protruded upward of the upper face **131** of the armrest part **13**. Thus, the person to be treated becomes ready to operate the first operation unit **20**.

Also, after ending the operation of the first operation unit **20**, the person to be treated is allowed to push down the first operation unit **20** or the holding part **50** holding the first operation unit **20** so that the holding part **50** can be moved to the first position P**1** and moreover fixed at the first position P**1**. The first operation unit **20** is maintained contained inside the container recess **40**. After an end of the treatment, the person to be treated sets the first operation unit **20** contained in the container recess **40**, so that the first operation unit **20** is not obstructive when the person to be treated leaves the main body **10**.

As described above, the person to be treated is allowed to easily take out the first operation unit **20** from the container recess **40**, as required, with simplicity. Also, the first operation unit **20**, when unnecessary, can be contained in the container recess **40**. Thus, the first operation unit **20** is less obstructive when the person to be treated is seated on the main body **10** or leaves the main body **10**. As a result of these, it is achievable to increase convenience to the person to be treated.

Second Embodiment

Another embodiment of the chair-type massage machine according to the present invention will be described with reference to the drawings. FIG. **6** is a schematic sectional view showing a state in which the first operation unit **20** is contained in the container recess **40**. FIG. **7** is a schematic block diagram of a chair-type massage machine **100***a* according to a second embodiment. The chair-type massage machine **100***a* of the second embodiment differs from the chair-type massage machine **100** both in that a second operation unit **30***a* and a moving mechanism **70** are different from those of the chair-type massage machine **100** and in that the chair-type massage machine **100***a* includes a lid portion **134**, a rail portion **43** and a detection unit **80**. A controller **200**, which is omitted in the drawings in the first embodiment, is also shown in the figure. Substantially like components of the chair-type massage machine **100***a* in conjunction with the chair-type massage machine **100** are designated by like reference signs, and detailed description of those like components is omitted.

In the chair-type massage machine **100***a*, as shown in FIG. **7**, all of the first operation unit **20**, the second operation unit **30***a*, the moving mechanism **70**, the detection unit **80**, a reclining mechanism **101**, and a moving mechanism **102** are connected to the controller **200**.

The controller **200** controls operations of each of the units and mechanism of the chair-type massage machine **100***a*. The controller **200** includes a computer unit having an arithmetic processing circuit such as a CPU or an exclusive processor or the like. The controller **200** may be such that the circuit itself performs arithmetic operations or that control programs stored in an unshown storage unit are read and executed. The storage unit may be formed of a memory circuit, in which personal information and discrete settings and other information as to person to be treateds may be stored in addition to the foregoing control programs.

In addition, although the controller **200** is described as a member independent of the first operation unit **20** in this embodiment, yet this is not limited to. For example, the first operation unit **20** may serve also as the controller **200**.

The second operation unit **30***a* includes a circuit enabled to deliver a signal to the controller **200** when operated. For example, the second operation unit **30***a* may be one which includes a pushbutton switch and which delivers a signal to the controller **200** when the pushbutton switch is pushed. The second operation unit **30***a* may also be other than this. The second operation unit **30***a* is set to such a position as to be operable for the person to be treated seated on the main body **10**. In addition, the second operation unit **30***a* may be so designed as to serve also as the controller **200**.

The reclining mechanism **101** and the massage mechanism **102** receive control signals from the controller **200** to operate according to the control signals. In addition, without being limited to this, a first operation unit **20** may transmit control signals directly.

The detection unit **80** includes a detection sensor for detecting that the person to be treated has been seated, or is seated, on the main body **10**. The detection sensor may be, for example, a pressure sensor, an optical sensor, an infrared sensor, or the like. Other than these, a wide range of sensors capable of detecting the seating of the person to be treated may be adopted.

<Moving Mechanism **70**>

The moving mechanism **70** will be described in detail below. As shown in FIGS. **6** and **7**, the moving mechanism **70** includes a motor **71**, a pinion gear **72**, and a rack gear **73**. The motor **71** is an electric motor, which is an example of the electric actuator. Instead of the motor, a wide range of devices capable of electrically outputting motive power may be adopted. The pinion gear **72** is fixed to an output shaft of the motor **71**. The pinion gear **72** is rotated by rotation of the output shaft of the motor **71**. The rack gear **73**, having gear teeth arrayed in linear shape, is fitted to an outer surface of the guide pole portion **52** in the holding part **50**.

The pinion gear **72** is meshed with the rack gear **73** so that the pinion gear **72** and the rack gear **73** transform rotational motion of the motor **71** into linear motion of the holding part **50**. That is, rotational power of the motor **71** is transmitted via the pinion gear **72** and the rack gear **73** as power for moving the holding part **50** in an up-and-down direction. In addition, the moving mechanism **70** may include a mechanism for restricting movement of the holding part **50**, such as a break mechanism. The break mechanism allows the holding part **50** to maintain in position even with power feed to the motor **71** cut off.

The chair-type massage machine **100***a* includes a lid portion **134** which is opened and closed by an unshown drive mechanism of the moving mechanism **70**. In addition, the lid portion **134** may be opened and closed by being pushed or pulled by the holding part **50** during movement of the holding part **50**. The container recess **40** has a rail portion **43** for guiding the opened lid portion **134** inside the container recess **40**. The lid portion **134**, after opening the container recess **40**, is moved along the rail portion **43** so as to be contained inside the container recess **40**. By the lid portion **134**, falls of coins or other small articles into the container recess **40** can be suppressed.

<Operations of Chair-Type Massage Machine **100***a*>

Operations of the above-described chair-type massage machine **100***a* will be described with reference to the accompanying drawings. FIG. **8** is a flowchart showing operations of the chair-type massage machine **100***a*. It is noted that the flowchart shown in FIG. **8** shows operations in which the person to be treated handles the second operation unit **30***a* after the person to be treated is seated.

First, the controller **200** stands by until the second operation unit **30***a* is operated (step S**101** is repeated until a Yes is replied at step S**101**). When the second operation unit **30***a* is operated (Yes at step S**101**), the controller **200** drives the motor **71** of the moving mechanism **70** to move the holding part **50** to the second position P**2** (step S**102**). It is noted that before moving the holding part **50**, the moving mechanism **70** opens the lid portion **134**. While the holding part **50** is in the second position P**2**, the first operation unit **20** is exposed upward of the armrest part **13**. In this state, the person to be treated performs an input operation on the first operation unit **20**.

The controller **200** stands by until the input operation on the first operation unit **20** is completed (step S**103** is repeated until a Yes is replied at step S**103**). The input operation on the first operation unit **20** may be one which is decided as an operation completion upon detection that a specific operation has been performed, e.g., a specific button such as a start button (not shown) or a completion button (not shown) displayed on the touch panel of the display section **21** has been operated. The input operation completion may be detected other than these.

When the input operation on the first operation unit **20** is completed (Yes at step S**103**), the controller **200** drives the motor **71** to move the holding part **50** to the first position P**1** (step S**104**). After the holding part **50** is set to the first position P**1**, the moving mechanism **70** closes the lid portion **134**. Then, the controller **200** instructs the reclining mechanism **101** and the massage mechanism **102** to start massage treatment (step S**105**).

The controller **200** checks whether or not the treatment has been completed (step S**106**). The completion of treatment may be recognized when programs set by the first operation unit **20** have been fully processed, or when a set time has elapsed, or the like, but these are not limited to.

In some cases, the person to be treated may desire to operate the reclining mechanism **101**, the heater or the like even during the execution of the treatment. Therefore, the chair-type massage machine **100***a* is enabled to move the holding part **50** to the second position P**2** during the treatment.

With the treatment incomplete (No at step S**106**), the controller **200** checks whether or not the second operation unit **30***a* has been operated (step S**107**). When it is not ascertained that the second operation unit **30***a* has been operated (No at step S**107**), the controller **200** repeats the checking as to completion of the treatment (returns to step S**106**). When it is ascertained that the second operation unit **30***a* has been operated (Yes at step S**107**), the controller **200** checks whether or not the holding part **50** is in the second position P**2** (step S**108**).

When the holding part **50** is in the second position P**2** (Yes at step S**108**), the controller **200** drives the motor **71** to move the holding part **50** to the first position P**1** (step S**109**), then repeating the checking as to completion of the treatment (returns to step S**106**). When the holding part **50** is not in the second position P**2** (No at step S**108**), the controller **200** drives the motor **71** to move the holding part **50** to the second position P**2** (step S**110**), then repeating the checking as to completion of the treatment (returns to step S**106**).

When a completion of the treatment is ascertained (Yes at step S**106**), the controller **200** checks whether or not the holding part **50** is other than in the first position P**1** (step S**111**). When the holding part **50** is other than in the first position P**1** (Yes at step S**111**), the controller **200** drives the motor **71** to move the holding part **50** to the first position P**1** (step S**112**), where the processing flow is ended. Meanwhile, when the holding part **50** is in the first position P**1** (No at step S**111**), the processing flow is ended.

As described above, the person to be treated is allowed to easily take out the first operation unit **20** from the container recess **40**, as required, with simple operation. Also, the first operation unit **20**, when unnecessary, can be contained in the container recess **40**. Thus, the first operation unit **20** is less obstructive when the person to be treated is seated on the main body **10** or leaves the main body **10**. As a result of these, it is achievable to increase convenience to the person to be treated.

Moreover, even during the treatment, the person to be treated is allowed to operate the first operation unit **20** with simplicity. The second operation unit **30***a* is a signal-transmitting electrical device and therefore has a high degree of freedom for installation. It is also allowable to provide the second operation unit **30***a* in plurality.

<First Modification>

The chair-type massage machine **100***a* includes the detection unit **80**. Therefore, the moving mechanism **70** is enabled to have a seating-linked sequential function of detecting a seating of the person to be treated and subsequently operating the holding part **50** in leakage by exploiting the detection unit **80**. The seating-linked sequential function is explained below with reference to the drawings. FIG. **9** is a flowchart showing operations of the seating-linked sequential function. The flowchart shown in FIG. **9** is substituted for step S**101** in the flowchart of FIG. **8**. Only the seating-linked sequential function will be described for the explanation of the first modification.

As shown in FIG. **9**, the controller **200** stands by until a seating is detected (S**201** is repeated until a Yes is replied at step S**201**). When a seating is detected (Yes at step S**201**), the controller **200** checks whether or not the seating-linked sequential function is ON (step S**202**). When the seating-linked sequential function is not ON (No at step S**202**), the controller **200** checks whether or not the second operation unit **30***a* has been operated (step S**203**). When no operation of the second operation unit **30***a* is ascertained (No at step S**203**), the controller **200** returns to the checking as to whether or not the seating-linked sequential function is ON (returns to step S**202**).

When the seating-linked sequential function is ON (Yes at step S**202**) or when it is ascertained that the second operation unit **30***a* has been operated (Yes at step S**203**), the controller **200** instructs the motor **71** to move the holding part **50** to the second position P**2** (step S**102** in FIG. **8**). Following operations are similar to those shown in FIG. **8** and so omitted.

When the person to be treated is seated, the first operation unit **20** automatically gets outside of the container recess **40** by the seating-linked sequential function. Accordingly, there is no need for operating the second operation unit **30***a*, making it possible to increase convenience to the person to be treated. Further, since the first operation unit **20** gets outside even with the position of the second operation unit **30***a* unknown, making it possible to increase convenience to the person to be treated. In addition, the person to be treated may be notified of the position of the second operation unit **30***a* during a first input operation to the first operation unit **20**.

Although this embodiment has been described above on an example in which the seating-linked sequential function turns ON or OFF, yet the seating-linked sequential function may be set so as to be normally operating.

<Second Modification>

In the chair-type massage machine **100***a*, the moving mechanism **70** has a reclining-linked sequential function of moving the holding part **50** in linkage with the reclining mechanism **101**. FIG. **10** is a flowchart showing the reclining-linked sequential function. The reclining mechanism **101** is operable independently of operation of the massage mechanism **102**. That is, the reclining-linked sequential function is an interrupt operation which is executable to some degree of freedom during operations of the chair-type massage machine **100***a*.

As shown in FIG. **10**, the controller **200** stands by until an operation start of the reclining mechanism **101** is ascertained (step S**301** is repeated until a Yes is replied at step S**301**). When an operation start of the reclining mechanism **101** is ascertained (Yes at step S**301**), the controller **200** checks whether or not the reclining-linked sequential function is ON (step S**302**). When the reclining-linked sequential function is not ON (No at step S**302**), the processing flow is ended.

When the reclining-linked sequential function is ON (Yes at step S**302**), the controller **200** checks whether or not a motion of the reclining mechanism **101** is a transition from a sitting position to a lying position (step S**303**). When the motion of the reclining mechanism **101** is one from the sitting position to the lying position (Yes at step S**303**), the controller **200** checks whether or not the holding part **50** is other than in the second position P**2** (step S**304**).

When the holding part **50** is other than in the second position P**2** (Yes at step S**304**), the controller **200** instructs the motor **71** to operate so as to make the holding part **50** moved to the second position P**2** (step S**305**), then ending the processing flow. When the holding part **50** is in the second position P**2** (No at step S**304**), the processing flow is ended.

When the motion of the reclining mechanism **101** is a transition from the lying position to the sitting position (No at step S**303**), the controller **200** checks whether or not the holding part **50** is other than in the first position P**1** (step S**306**).

When the holding part **50** is other than in the first position P**1** (Yes at step S**306**), the controller **200** instructs the motor **71** to operate so as to make the holding part **50** moved to the first position P**1** (step S**307**), then ending the processing flow. When the holding part **50** is in the first position P**1** (No at step S**306**), the processing flow is ended.

As described above, the moving mechanism **70** operates the holding part **50** in linkage with the motion of the reclining mechanism **101** in order that the first operation unit **20** is drawn out or contained in. As a result, it becomes possible to increase convenience to the person to be treated. Although the reclining-linked sequential function is turned ON or OFF in the chair-type massage machine **100***a* of this modification, yet this is not limited to, and the reclining-linked sequential function may be set so as to be normally functioning.

For example, the person to be treated leaves the state of the sitting position to outside of the main body **10**. Therefore, while the person to be treated is in the sitting position, the first operation unit **20** is more likely to be obstructive. For this reason, the first operation unit **20** is contained in the container recess **40** while the person to be treated is in the sitting position. Meanwhile, the person to be treated seldom leaves the state of the lying position to outside of the main body **10**. In some cases, the person to be treated may desire to make an input operation for changing the posture or prolonging the treatment or the like. Accordingly, while the person to be treated is in the lying position, the chair-type massage machine **100***a* sets the first operation unit **20** exposed outside. This operation, in the chair-type massage machine **100***a*, is automatically implementable by the reclining-linked sequential function. As a result, this can increase convenience to the person to be treated.

In addition, for example, the reclining-linked sequential function may be linked with reclining operations subsequent to the treatment start (step S**105**) in the flowchart of FIG. **8**. The first operation unit **20** can be automatically drawn outside in linkage with the motion of the reclining mechanism **101** even when the person to be treated has operated the reclining mechanism **101** alone on the way of treatment.

<Third Modification>

FIG. **11** is a view showing the first operation unit **20** positioned in a third position P**3**. With the chair-type massage machine **100***a*, the person to be treated, while in the lying position, may desire to check only images displayed on the display section **21** of the first operation unit **20**. The images may include motion images, still images and the like. Also, the images may include a changeover key for changing over playing operation involved in playing music as an example. Like this, a desirable state may be that only at least part of the display section **21** is exposed outside of the container recess **40**.

Accordingly, as shown in FIG. **11**, the controller **200** may control the motor **71** so that the holding part **50** can be stopped at a third position P**3** between the first position P**1** and the second position P**2**. For example, the holding part **50** may be stopped at a predetermined third position P**3** while being moved between the first position P**1** and the second position P**2**. Further, the holding part **50** may also be stopped upon acceptance of an operation input from the person to be treated to the second operation unit **30***a*. In this case, the person to be treated may be enabled to stop the holding part **50** at a third position P**3** that is an arbitrary site designated by the person to be treated.

In each of above described embodiment, it is assumed that the container recess **40** is placed in the upper face of an armrest part **13**, yet this is not limited to. The placement site of the container recess **40** may be selected from a wide range of positions, such as a frontage of a lateral portion of the backrest part **12**, that allow the person to be treated to easily operate the first operation unit **20**.

The present invention is applicable to chair-type massage machines for kneading and relaxing the body of a person to be treated.

While the foregoing has described the embodiment of the present invention, the present invention is not limited thereto. Furthermore, the embodiment of the present invention can be implemented by adding various modifications thereto without departing from the spirit of the invention.

In order to achieve the above object, the present invention provides a chair-type massage machine **100** (**100***a*) including: a main body **10** on which a person to be treated is to be seated; a first operation unit **20** for accepting an input operation made by the person to be treated; a container recess **40** formed in the main body **10** and capable of containing the first operation unit **20**; a holding part **50** at least part of which is placed inside the container recess **40** to hold the first operation unit **20**; and a moving mechanism **60** (**70**) for moving the holding part **50**. The holding part **50** is reciprocatably movable between a first position P**1** in which at least part of the first operation unit **20** is contained inside the container recess **40** and a second position P**2** in which the first operation unit **20** is exposed out of the container recess **40** at a ratio larger than that of the first position P**1**. The chair-type massage machine **100** (**100***a*) further includes a second operation unit **30** (**30***a*) which is placed on the main body **10** and which, based on an operation by the person to be treated, instructs the moving mechanism **60** (**70**) to execute movement of the holding part **50**.

In the above-described chair-type massage machine **100**, the moving mechanism **60** includes a biasing part **61** placed in the container recess **40** to bias the holding part **50** in a direction directed from the first position P**1** toward the second position P**2**. The second operation unit **30** includes a lock part **32** placed in the container recess **40** to restrict movement of the holding part **50** set in the first position P**1**. When the second operation unit **30** is operated, the lock part **32** may derestrict movement of the holding part **50**.

In the above-described chair-type massage machine **100**, the moving mechanism **70** may include an electric actuator **71** enabled to reciprocatably move the holding part **50** between the first position P**1** and the second position P**2**; and when the second operation unit **30***a* is operated, the moving mechanism **70** may either move the holding part **50**, which is in the first position P**1**, to the second position P**2**, or move the holding part **50**, which is in the second position P**2**, to the first position P**1**.

The above-described chair-type massage machine **100** may further include a detection unit **80** for detecting a seating of the person to be treated, wherein the moving mechanism **70** may move the holding part **50** to the second position P**2** when the detection unit **80** detects a seating of the person to be treated.

In the above-described chair-type massage machine **100**, the main body **10** with the person to be treated seated thereon may be changeable between a sitting position in which an upper-half body of the person to be treated is raised up and a lying position in which the upper-half body of the person to be treated is tilted backward, and the moving mechanism **70** may move the holding part **50** toward the second position P**2** for a transition of the main body **10** from the sitting position to the lying position, and move the holding part **50** toward the first position P**1** for a transition of the main body **10** to the sitting position.

In the above-described chair-type massage machine **100**, the moving mechanism **70** may stop the holding part **50** at a third position P**3** which is an intermediate position between the first position P**1** and the second position P**2**.

In the above-described chair-type massage machine **100** (**100***a*), the main body **100** may include: an armrest part **13** which is placed beside a seat part **11** for holding a waist of the person to be treated and which is enabled to hold a forearm of the person to be treated, and a backrest part **12** for holding an upper-half body of the person to be treated, wherein the container recess **40** may be formed either in an upper face **131** of the armrest part **13** or in a front face of a lateral portion of the backrest part **12**.

What is claimed is:

1. A chair-type massage machine comprising:

a main body on which a person to be treated is to be seated;

a first operation unit for accepting an input operation made by the person to be treated;

a container recess formed in the main body and capable of containing the first operation unit;

a holding part at least part of which is placed inside the container recess to hold the first operation unit;

a moving mechanism for moving the holding part; and

a second operation unit which is placed on the main body and which, based on an operation by the person to be treated, instructs the moving mechanism to execute movement of the holding part, wherein

the holding part is reciprocally movable by the moving mechanism between a first position in which at least part of the first operation unit is contained inside the container recess and a second position in which the first operation unit is exposed out of the container recess at a ratio larger than that of the first position;

the moving mechanism includes an electric actuator enabled to reciprocally move the holding part between the first position and the second position, and

when the second operation unit is operated, the moving mechanism either moves the holding part, which is in

the first position, to the second position, or moves the holding part, which is in the second position, to the first position.

2. The chair-type massage machine according to claim **1**, further comprising

a detection unit for detecting a seating of the person to be treated, wherein

the moving mechanism is enabled to move the holding part to the second position when the detection unit detects a seating of the person to be treated.

3. The chair-type massage machine according to claim **1**, wherein

the main body with the person to be treated seated thereon is changeable between a sitting position in which an upper-half body of the person to be treated is raised up and a lying position in which the upper-half body of the person to be treated is tilted backward, and

the moving mechanism is enabled to move the holding part toward the second position for a transition of the main body from the sitting position to the lying position, and to move the holding part toward the first position for a transition of the main body to the sitting position.

4. The chair-type massage machine according to claim **1**, wherein

the moving mechanism stops the holding part at a third position which is an intermediate position between the first position and the second position.

5. The chair-type massage machine according to claim **1**, wherein

the main body includes:

an armrest part which is placed beside a seat part for holding buttocks and thighs of the person to be treated and which is enabled to hold a forearm of the person to be treated, and

a backrest part for holding an upper-half body of the person to be treated,

wherein the container recess is formed either in an upper face of the armrest part or in a front face of a lateral portion of the backrest part.

* * * * *